my publishers than of myself, that this opinion of his is not shared by the writer of any one, so far as I have seen, of the notices which have appeared in other papers.

WILLIAM A. TILDEN.

Royal College of Science, London, June 19.

The Gravitation Constant.

I BEG to point out that at the end of the article on pp. 127–128 of NATURE, relating to my researches on the gravitation constant, there is a misprint. The "oscillation" result for 1892 should be 5·523 instead of 5·520.

The error is not great, but by correcting it a much better concordance appears between the four principal values.

CHARLES BRAUN.

Mariaschein in Bohemia, June 21.

THE AMERICAN EXCAVATIONS IN SOUTHERN BABYLONIA.

FOR the last fifteen or sixteen years we have been glad to watch the endeavours of the Americans to carry out systematic excavations in Southern Babylonia, and we feel sure that all will rejoice with them now that they are able to report a very considerable success. It will be remembered that the first American to visit that country with a view of acquiring antiquities was Mr. Hayes Ward, who went out there early in the "eighties"; and the report which he gave on the matter probably helped forward the later expeditions of Dr. Peters and Mr. Haynes. Dr. Peters and a small party of promising young men went to Baghdad in 1890, and set out from that city for the ruins of Niffer, which are situated a few days' journey to the south-west, where they began to dig. For various reasons, however, Dr. Peters withdrew from the work soon afterwards, and the Committee of Excavations of Pennsylvania University determined to place the undertaking in the hands of Mr. Haynes, then the American Consul at Baghdad. Mr. Haynes took over the work, and for some years past he has devoted all his time to it, through the heats of summer when the land is burnt as hard as a brick, and through the rains of winter and early spring when the plains become seas of mud, has he lived at Niffer, patiently digging through the ruins of the temple, and tower, and ramparts, and court-yard, and hidden chambers of that ancient city. No other excavator has done his work so thoroughly, or so well in consequence, for he never left his post whilst diggings were going on; and though the cuneiform scholar sitting in a comfortable chair at home reading the descriptions of the work by Dr. Hilprecht[1] may think lightly of such devotion to science, it by no means diminishes its value. Moreover, the Arab of the neighbourhood of Niffer is not the gentlest of men; on the contrary, when he is displeased with the "Frangi" excavator, he will break his water-jars, or slit his water-skins as they are passing on donkeys to the river, or try to burn down his tents, or even to kill him, as he has done to more than one excavator.

In the limited space at our disposal we do not intend to describe the details of Mr. Haynes' excavations, but only to call attention to the general results of his work and their bearings upon the early history of civilisation in the East. Like all the cities which lie between the Tigris and Euphrates below Hillah and Baghdad, the mounds of Niffer contain the ruins of a temple of considerable size and of a tower; both rested upon a solid clay platform, the intention of the architect being to lift the buildings which were to be set upon it out of the reach of floods and overflows of the river. Round these ran a wall more than fifty feet in thickness, the object of which was, naturally, to keep out foes from the temple buildings and tower. The ruins which Mr. Haynes found on the platform belong to the temple and tower which a king called Ur-gur built about 2600 B.C.; but below this, Mr. Haynes found another platform which Sargon I. had built some twelve hundred years earlier, for all the bricks bore the name of this king and of his son Naram-Sin. Digging down deeper, Mr. Haynes found the ruins of one or more temples, but there are no inscriptions or marks upon any object which will help us to date them. Elsewhere in the outlying buildings in the mound small but strongly built chambers were found, and it is thought that these were employed for the safe keeping of records, tablets, and the like. Thus it seems that the oldest inscribed object discovered at Niffer belongs to the reign of Sargon I., who, according to the information given on the famous Cylinder of Nabonidus, reigned 3200 years before that king's time. The question which will naturally be asked next is, "To what period do the temples, the ruins of which were found beneath Sargon's platform, belong? and who built them?" At present it is impossible to give a satisfactory answer. Those who would reckon years by the depth of deposits say these temple-ruins are about 2000 years older than Sargon's platform; but this is, after all, only a guess, and if probabilities are taken into consideration we might as well date them at 10,000 B.C. as 6000 B.C., and we deprecate the use of exact figures in such matters. What is to be considered is the fact that about 3800 B.C. Sargon was able to build such a strong fortress, and that all the faculties of civilisation which such a power implied existed at that remote date. As to the earlier buildings which he found there and the platform on which they rested, they probably only stood upon the ruins of earlier buildings and of an earlier platform, and the site of Niffer being favourable for a city, it is more than likely that one stood there from time immemorial. To attempt to limit a civilisation of such antiquity as that of Southern Babylonia by thousands of years is, in our opinion, futile; though figures are useful at times to convey to the non-expert a general idea of antiquity. Mr. Haynes has proved that Niffer, in common with Tell-Lo, was one of a number of large and important cities which flourished in Southern Babylonia between 4000 B.C. and 2500 B.C., and the materials which he has obtained will enable us to describe the knowledge and religion, and manners and customs of its people with a fulness and minuteness hitherto impossible. We trust that he will soon give us his own account of the work which he has carried out, and meanwhile accord him our thanks for what he has already done, and congratulations upon the great success which he has achieved.

THE FRESH-WATER FAUNA OF LAKE TANGANYIKA.

THE aquatic faunas of the great lakes of Central Africa, although like so many other features of the dark continent still largely unexplored, have attracted a good deal of attention during the last few years. It has been ascertained that some of these great sheets of water, although physiographically apparently so similar, are absolutely unlike each other in respect to the aquatic animals they contain. Thus the fishes and molluscs of Nyasa, which have been up to the present time by far the most completely known, show no forms which have deviated widely from easily recognisable fresh-water stocks, or that suggest that Nyasa has at any past time been more directly connected with the sea. On the other hand, one of the first items of zoological information which reached Europe concerning Tanganyika, was the discovery of a Craspidote medusa by Boehm in 1893. The mere existence of fresh-water medusæ is such a rare and remarkable occurrence, that scientific interest became at once turned towards the Tanganyika fauna as a whole, and a re-examination of the shells of the molluscs of the lake, which had been brought home by various travellers, showed that the medusa was only one member of a remarkable fauna, many of the forms of which were as singular and marine-looking as the jelly-fish itself. Up to the present time, however, the real nature of this remarkable assemblage of lake animals has of necessity remained entirely problematical, since, without more material, it was impossible to attempt to determine whether the close similarity, which some of the gastropod shells exhibit to species living elsewhere in the ocean, was due to actual affinity, or was brought about by a convergence of variations induced somehow in an originally fresh-water stock. To obtain the material sufficient to throw light on these forms, by a determination of their actual affinities, was the object of an expedition to Tanganyika, which, through the generosity of the Royal Society and British Association, I was able to undertake nearly two years ago.

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[1] "The Babylonian Expedition of the University of Pennsylvania," vol. i., 1893; vol. ii., 1896. (Philadelphia: Reprinted from *Trans. Amer. Philos Soc.*, N.S., vol. xviii., Nos. 1 and 3.)

The only practical route at present open to the Lake lies up the great Zambesi water-way, which, but for the Murchison Cataracts, extends from the coast to the north end of Lake Nyasa. From this point it is necessary to march across the elevated forest land, and mountain ranges which constitute the interior plateau. Approached in this direction the lake becomes first visible from the heights above Kituta, where a strip of bright green marsh-land skirts its southern coast. Descending from these heights the damp oppressive heat of Tanganyika is felt at once, and long before reaching the water's edge the forest is filled with the sickly scent which characterises the whole lake, and reminds one strongly of that of a weedy tidal beach. The lake has fallen considerably of late, and much of the coast-line is now obliterated by dense papyrus swamps, reeds, and partially submerged mimosa scrub, so that its actual shore is often very difficult to approach. In the deep water of this southern arm there are vast drift collections of empty Neothauma shells, which act as growing points for sponges, and constitute the feeding-ground of innumerable small active and entirely aquatic crabs. The living Neothaumas are found in shoaler water, generally on the flat sandy deposits which characterise the coast-line of other portions of the lake. Above the water's edge this sand has been thrown up by the wind and surf into low dunes, which are now covered with mimosa scrub and wild cotton, and beyond these, again, there is generally a strip of swamp swarming with Dactylethera, Ampularia shells, and frogs.

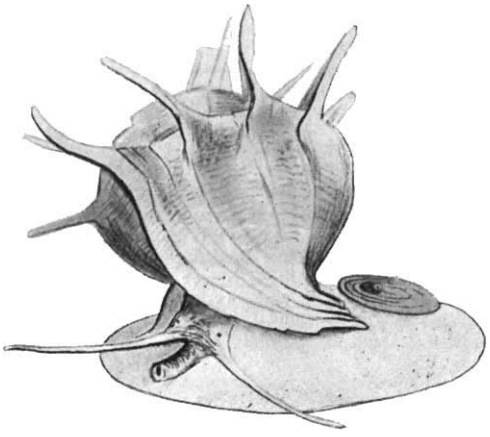

FIG. 1.—Living *Typhobia Horei.*

In many places, however, the mountains are not fringed by these lacustrine flats, and where the great western escarpments of the rift valley in which Tanganyika lies, rise perpendicularly from the water's edge, the submerged stones are covered with a bright growth of green algæ, and studded with numbers of the so-called Paramelania, a marine-looking gastropod, the affinities of which are not yet known. The great range of variation which these shells exhibit is most remarkable, and their differentation seems to be a simple function of the depth at which the shells exist, those with the most prominent processes being the lowest.

The different kinds of coast-line, which I have just described, are more or less characteristic of the whole lake, and each has a fauna peculiar to itself; but, on the flat sandy beaches, all sorts of shells, fish-bones, and the like are thrown up together by the waves, so that it is some time before one ascertains the habitat of each. Thus I observed the exquisite spined Typhobia shells two months before I found a specimen alive, owing to the fact that Typhobia, together with some curious associated forms, inhabit the profound depths of the lake, and are only to be obtained by dredging with lines of from five to seven hundred feet.

Like Neothauma and Paramelania, these deep-water gastropods are all viviparous; but while the first deposits only two or three large embryos at once, Typhobia produces a great number of bright green young. In this form all stages of development are present in the same animal, and we have, therefore, embryological material which may throw much light on the affinities of an aberrant group. It would be unprofitable for me, as yet, to enter into any discussion of the comparative morphology of these forms; but it may be interesting to note that, while the radula formula of Neothauma approximates in character to that of Paludina, that of Typhobia and its associates is almost unique, and although the Paramelanias show some similarity, in this respect, to the forms with which they have been provisionally associated, the radula of the so-called Lythoglythus of Tanganyika is absolutely unlike those of the forms to which it has been thought to belong.

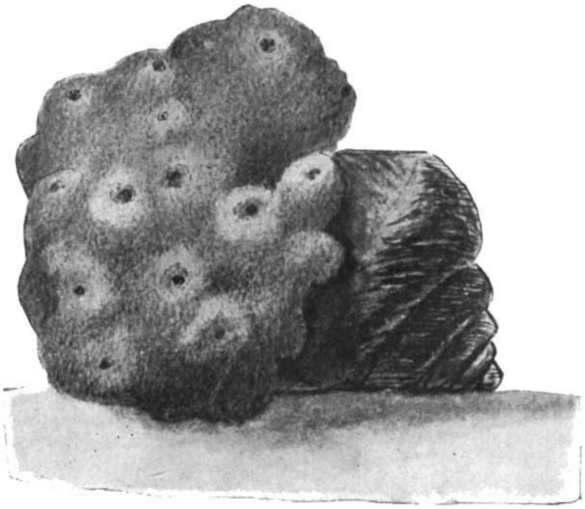

FIG. 2.—Sponge growing on dead shell of Neothauma.

Typhobia and its allies inhabit the flat mud bottom of the lake, and the mud itself contains numerous spiculæ, which, on treatment with nitric acid, are seen to be siliceous, many of them being indistinguishable from those of the sponge Potamolepis, found as an encrusting species in the Congo, but which I have not seen living in Tanganyika.

In many places the precipitous coast-line of the lake has been cañoned out by waves and storm-torrents into a succession of superb rocky headlands, and in the still waters of the recesses, which they partially enclose, there are innumerable swarms of prawns, some of which are certainly Palœmon-like in structure; but I am not yet sure of the affinities of them all. Like those of the Lago di Garda in Italy, lake prawns are generally supposed to have migrated up the rivers from the sea; but it is curious that they should have found their way 2700 feet up into Tanganyika, and yet not have reached Nyasa, which is so much nearer the coast.

It would be impossible within the limits of this article to give any account of the widely different forms of Tanganyika fish; but there is a curious and, I believe, quite new example of protective mimicry exhibited by a small chromis, which, in order to escape from the swarms of kingfishers along the shore, has simulated the bands of colour, size, and mode of swimming of a leech.

There appears to be only one species of medusa in Tanganyika; but this species, like so many of the lake animals, is subject to wide variation, and if the intermediate forms could not have been obtained, the extremes would certainly have been regarded as distinct species. They are rather local in their distribution, and are not always easy to find, but in some places they exist in countless numbers, and are seen at every depth, slowly pulsating after the manner of jelly-fish, till they reach the surface, and then sinking again motionless with their array of long tentacles standing stiffly up above the bell.

Towards evening the deep water of the lake is often filled with a finely-divided substance, that glitters in the sunshine like precipitated gold, and this appearance is found to be caused by the sculptured shells of swarms of Peridinia, together with a number of large infusoria, the broad bands of cilia and undulating membranes of which show them to be related to the Condylostomas. The appearance produced by this assemblage of pelagic protozoa is probably what Livingstone described in his last journal as a yellow scum on the surface of the lake, attributing it to some vegetable form.

The assemblage of animals which I have just described appears to be almost entirely restricted to the confines of the lake, and it is this geographical isolation to which at present I would draw attention, as it is, without doubt, among the most remarkable characteristics which the fauna possesses. In fact, the presence of such an assemblage of animal forms in an inland and greatly elevated lake is only intelligible by supposing either that the lake itself was at one time connected with the sea, and that its fauna is a collection of types which have persisted as survivals of an oceanic series that has elsewhere passed away, or that its marine characters are due to parallel development, produced in a fresh-water stock by the action of some conditions obtaining in an immense inland lake. I would at present offer no opinion as to which of these surmises is likely to prove correct; but whatever supposition may be entertained, it becomes obvious that the fauna of Tanganyika is comparatively old, for it is unlike anything now inhabiting the sea, and if it is derived from a previous fresh-water stock, much time would be required for the evolution of its widely-divergent present forms. This conclusion as to the comparative antiquity of the Tanganyika fauna is, in my opinion, the most important which can be drawn with certainty from a cursory survey of the facts; and, without attempting to push comparisons at present, the remarkable similarity between several varieties of Paramelania and those of the equally variable Jurassic genus Purpurina, between other varieties of Paramelania and the American and Southern European Pirguliferas, should be fully borne in mind. The determination of the actual affinities of the Tanganyika forms, which are often exclusively related to the lake, can only be made by a prolonged comparative study of the morphology of each, and it would be at present useless to speculate on the result. I have here only indicated some of the peculiarities of the fauna of the lake as they present themselves to a naturalist on the spot, the actual results of the investigation having yet to be produced.

J. E. S. MOORE.

THE LAWRENCE MEDAL.

WE are glad to be able to give a reproduction of a fine gold medal of Sir William Lawrence, now in the Royal Academy Exhibition, designed and executed by Alfred Gilbert, R.A. It forms part of a scholarship, founded in memory of Sir William Lawrence at St. Bartholomew's Hospital, and is given annually. The medal, cast and chased, $2\frac{1}{4}$ inches in diameter, shows the face and head in high relief, and gives striking evidence of the artist's skill, as the likeness well preserves the dignity and intellectual power of the original. The view is nearly full face, not the usual profile, a treatment of which there are but few examples, either ancient or modern, and of difficult execution. The reverse has an allegorical subject suited to the aim of the scholarship, and instinct with the grace and fancy of which Mr. Gilbert is master. A youth, full of confidence, presses through the shield dividing him from life, whilst wisdom and science on either hand whisper counsel as they point to the motto on the shield, part of the line from Homer,